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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/574,955	05/19/2000	Michael J. Renn	881.008US2	9915

5179 7590 02/11/2004

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EXAMINER

SONG, SARAH U

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 02/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/574,955

Applicant(s)

RENN ET AL.

Examiner

Sarah Song

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2003.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☒ Claim(s) 16-19 and 27-32 is/are allowed.  
6) ☒ Claim(s) 1-15, 20, 21, 24-26 and 33-42 is/are rejected.  
7) ☒ Claim(s) 22 and 23 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 09/11/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. Applicant's communication filed on September 11, 2003 has been carefully considered and placed of record in the file. Claims 1, 4, 5, 11, 19, 20, 27, 30-33, 36, 39 and 40 have been amended. The arguments advanced therein regarding the rejections over Nishimura et al., Kindler et al., Ashkin, and Richart, considered together with the amendments made to the claims changing "optical conductor" to "optical fiber", are persuasive and the rejections based upon prior art made of record in the previous Office Action are withdrawn. Claims 1-42 are pending.

#### ***Claim Objections***

2. Claims 20, 32 is objected to because of the following informalities: In claim 20, "the through channel" in line 5, and "the optical conductor" in line 6 should be changed to "a through channel" and "an optical conductor", respectively, to correct for the lack of proper antecedent basis for those limitations. In claim 32, Examiner believes that "20" should be -30-, and will be examined accordingly.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1, 2, 4-10, 33, 34, 37 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Lewandowski et al. (cited by the applicant).** Lewandowski et al. discloses non-atomic (micron sized > 10 nm) particles being guided through a hollow optical fiber by a

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laser, which confines the particles. A source of the particles is provided before confining the particles inside the beam (inherent). The particles, in air or in aqueous solutions, are guided down the hollow portion of the fiber. Lewandowski et al. disclose 7  $\mu\text{m}$  glass and polystyrene particles. Applications include transfer of a particle (one material) or separation of particles (more than one material), and deposition onto a surface (substrate). It is noted that the laser beam would have inherently imparted a degree of thermal treatment to the particles. It is also noted that hollow optical fibers typically comprise a first opening, upon which an optical beam is incident, and a second opening, through which an optical beam exits, wherein the first and second openings are located at two opposite ends of the optical fiber. Furthermore, since Lewandowski et al. discloses the method of guiding particles through a hollow optical fiber by means of a laser beam, the apparatus inherently includes at least a hollow optical fiber (an optical conductor having a first and second opening, a through channel or a hollow portion), a particle source, and a laser beam since those three elements are necessitated in the method that is disclosed.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 3, 11-15, 20, 21, 24-26, 35, 36 and 39-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewandowski et al.** Lewandowski et al., as discussed above, discloses guiding non-atomic particles (about 7  $\mu\text{m}$  in size, which is larger than a wavelength of

conventional laser beams) through a hollow optical fiber by means of a laser beam.

Lewandowski et al. discloses particles in aqueous solutions (i.e. comprising a liquid portion and a solid portion). As previously noted, the laser beam would have inherently imparted a degree of thermal treatment to the particles.

7. Regarding claims 11-15, 20, 21, 24-26 and 39-42, Lewandowski et al. does not specifically disclose the method of material deposition, or an apparatus for material deposition. However, material deposition on a substrate is clearly suggested by Lewandowski et al. That is the step of depositing a material onto a substrate is suggested, and the apparatus comprising a substrate is also suggested. Any substrate inherently comprises a plurality of locations onto which the particles can be deposited. The step of moving the substrate is not specifically disclosed. However, the step of moving the substrate would have been obvious to deposit the particles at various locations on the substrate to form a pattern or to form a uniform coating across the substrate surface. The step would require the laser beam, and the confined particles, to exit the optical conductor through a second opening, optical fibers commonly comprising first and second openings. Therefore, claims 11-15, 20, 21, 24-26 and 39-42 are obvious over Lewandowski et al.

8. Regarding claims 3, 35 and 36, Lewandowski et al. does not specifically disclose a focusing system. Focusing arrangements are well known in the art of fiber optics. A focusing arrangement would have been obvious for the purpose of increasing the coupling efficiency of the laser beam in to the hollow optical fiber. Additionally, Lewandowski et al. does not specifically disclose the step wherein the laser beam exits the optical fiber through a second opening. As stated previously, optical fibers commonly comprise first and second openings for

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coupling in and coupling out optical beams. The method step would have been obvious to couple out the laser beam and the confined particle for particle transfer, separation, or deposition, as suggested by Lewandowski et al.

***Allowable Subject Matter***

9. Claims 16-19 and 27-32 are allowed.

10. Claims 22 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or suggest, alone or in combination; all of the method limitations as claimed. That is the prior art of record does not disclose or suggest, the steps of transforming at least a portion of the solution into a plurality of non-atomic droplets, confining the droplets inside a laser beam while directing the laser beam toward a first opening of an optical conductor having a through channel; transporting the droplets inside the through channel from the first opening to a second opening; and depositing the droplets of material onto the substrate after the laser beam exits the second opening of the optical conductor. Lewandowski et al. discloses transporting particles that are in an aqueous solution through an optical conductor by means of a laser beam, but does not disclose or suggest transporting droplets in an optical conductor. Therefore, claims 16-19, 22 and 23 would be allowable over the prior art of record.

12. Claims 27-32 are allowable since the prior art does not disclose or reasonably suggest the method of confining a particle as claimed wherein the particle is confined inside a through channel of an optical fiber. See also page 12 of applicant's response.

***Response to Arguments***

13. Applicant's arguments with respect to Lewandowski et al. have been considered but not persuasive. Applicant states that light guidance in hollow fibers would not be readily apparent except to those having a specialty in the area. Examiner respectfully disagrees. One of ordinary skill in the art would have been well apprised of light guidance through hollow core fibers. Hollow core fibers were known in the art at the time of the invention, especially for guidance of IR light.

14. Applicant also states that Lewandowski et al. is a non-enabling disclosure since it does not mention the enabling details as discussed by the Applicant on page 12 of the response. Although Lewandowski et al. does not mention the "enabling details", Lewandowski et al. does mention every limitation in the claim as noted in the 102(b) rejection above. That is, the scope of the disclosure of Lewandowski et al. is entirely consistent with the scope of the claims noted in the 102(b) rejection above. Therefore, the fact that Lewandowski et al. does not mention the "enabling details" is moot.

15. The rejections over Nishimura, Ashkin, Kindler, Richart have been withdrawn in view of the amendment to the claims, and in view of the non-obviousness pointed out by the applicants regarding the laser beam guidance of particles within a fiber as compared to laser beam guidance of particles within a generic conduit.

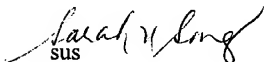
16. It is also noted that the previously indicated claim objections (represented in this Office action), were not resolved by the amendment.

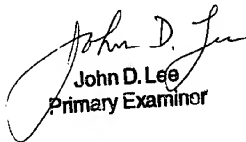
***Conclusion***

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

18. Any inquiry concerning the merits of this communication should be directed to Examiner Sarah Song at telephone number 571-272-2359. Any inquiry of a general or clerical nature, or relating to the status of this application or proceeding should be directed to the receptionist at telephone number 571-272-1562 or to the technical support staff supervisor at telephone number 571-272-1615.

  
SUS

  
John D. Lee  
Primary Examiner